

## VEHICLE CUPHOLDER

### Related Back

This application is a continuation in part of co-pending application serial number 09/513,908, entitled "Vehicle Cupholder," filed on February 28, 2000.

### Field of Invention

The present invention relates to vehicle so-called cupholders and more particularly to a beverage holder which is especially suited for use in vehicles.

### Background of the Invention

Currently, typical highway vehicles are each equipped with beverage holders often referred to as cupholders. The cupholders are provided to allow vehicle operators to set a beverage container down in order that the operator can have both hands free for operating a vehicle. Cupholders are also provided for the convenience of passengers.

Prior cupholders exhibited a number of shortcomings. Beverage containers come in a range of sizes. If a prior cupholder was large enough for larger sizes, it was too large for smaller sizes and obviously and conversely if appropriately sized for smaller sizes it was too small for larger sizes. As a consequence cupholders while usually providing adequate vertical support, provided little if any lateral support with the result that tipage and spillage occurred all too often. Spillage was especially likely if the vehicle was operating in rough conditions.

Recently there has been a trend towards the utilization of larger and larger beverage container sizes. While at one time a typical soft drink beverage or carry out coffee or other beverage serving was six ounces, containers of 12 ounce and larger servings have become very

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popular. Indeed beverages are sometimes provided in containers as large as 32 ounce quarts. These larger sizes are reasonably popular among over the highway truck and tractor operators because such operators often travel several hours between stops and opportunities to replenish a beverage supply.

It would be desirable to have a holder which accommodates a substantial range of beverage container sizes and securely holds containers sized to fall within the range.

### Summary of the Invention

A cupholder embodying the invention includes a recessed base. The recess is sized to receive the lower portion of a beverage container which can be mounted on a base surface at the bottom of the recess. A mechanism is provided to perimetally grip a container after it has been mounted in the recess.

In the disclosed arrangement the mechanism is in the form of an annular inflatable bladder positioned within the recess and around a beverage container receiving space. When a beverage container is mounted on the base surface a valve is actuated to initiate air supply communication with the interior of the annular bladder. The bladder is inflated until it perimetally grips the container holding it securely in an upright position.

While the preferred and disclosed embodiment includes an annular bladder it should be apparent that other forms may be provided so long as a circular beverage container is engaged in at least three spaced locations since three points locate a circle.

Accordingly, the objects of the invention include providing a novel and improved beverage container holder especially adapted for use in vehicles and a process for supporting a beverage container in a vehicle when it is in operation.

In one embodiment, the presently claimed invention takes the form of a holder for releasably securing a manually carryable article in a vehicle. As discussed above, operators and passengers of vehicles often desire to bring relatively small articles onboard transporting vehicles and keep these articles nearby for ready access. Examples of such articles include mobile telephones and individual beverage servings typified by twelve ounce cans and disposable cups of various sizes, all of which are defined herein as being capable of being hand-carried and hand-held. It should be appreciated that manually carryable does not merely denote portable articles, but items that are sufficiently small to be carried about by hand. Holders configured according to this embodiment of the invention comprise (include, but are not limited to) a securement means for anchoring such manually carryable articles within an occupant compartment of a vehicle. Such securement means can take various forms, but in at least one exemplary embodiment disclosed herein, the securement means incorporates an inflatable bladder having a deflated configuration for facilitating insertion of an article therein and which establishes an article-release configuration of the holder. The inflatable bladder also has an inflated configuration for impeding disengagement of an inserted article therefrom and which establishes an article-securing configuration of the holder. The resistance to disengagement imposed by an inflated bladder is due to the applied squeeze effect that the engorged bladder has on encircled article.

To avoid unintended movement of held or secured articles, the securement means, or holder, is coupled to an interior of an occupant compartment of a vehicle and spatially fixed therein within reach of at least one vehicle occupant. Location within arm's reach of an occupant is preferred because many of the articles that are contemplated to be suitable for the presently disclosed holders are of a nature which users wish to frequently access, and which are typified by the examples of beverage containers and mobile telephones. Advantageous mounting locations for holders of the present type are on center-consoles and dashboards traditionally found in occupant compartments of transport vehicles at positions well within both operator and passenger reach.

One particular embodiment of the holder includes a support body that defines an interior space and the inflatable bladder is confined within that interior space. The support body has an open-top recess surrounded by a substantially annular wall that defines the interior space of the support body.

In one particular embodiment, the support body and inflatable bladder are predominantly round in horizontal cross-section and are especially suited for releasably gripping a hand-held beverage container.

In furtherance of the interior space's definition, an inwardly protruding lip is located at a top portion of the annular wall. The lip has a reduced inner diameter relative to an inner diameter of the substantially annular wall.

Most commercial vehicles upon which the article holder of the present invention is envisioned to be a suitable accessory has one or both of a pressured air and hydraulic source. Capitalizing thereupon, a pressure feed line is fluidly interconnected between the inflatable bladder and such a vehicular fluid pressure source. Preferably, a control valve is disposed between the inflatable bladder and the vehicular fluid pressure source and is configurable to transition the holder between the article-release configuration and the article-securing configuration.

In an automated version, or at least semi-automated embodiment of the presently disclosed article holder, a sensor or sensing means is provided for detecting the presence of an inserted article and causing the inflatable bladder to transition between the inflated and deflated configurations. Examples of such sensing means include motion sensors, photovoltaic-type sensors, and pressure sensors.

In a commensurate embodiment, the invention takes the form of a method for releasably securing a manually carryable article in a vehicle.

#### Brief Description of the Drawings

Figure 1 is a perspective view of one embodiment of a cupholder of this invention;

Figures 2 and 3 are sectional views of the cupholder of Figure 1 showing an inflatable bladder in deflated condition in Figure 2 and in an inflated condition in Figure 3;

Figure 4 shows a more sophisticated embodiment including a photovoltaic cell and a

pressure sensitive membrane each for sensing the presence of a beverage container; and

Figure 5 is a somewhat schematic view of a vehicle with a cupholder of the present invention mounted in its cab.

#### Detailed Description of Preferred Embodiments

In the drawings a cupholder is shown generally at 10. In Figure 5, the cupholder is shown mounted in a truck or tractor 11 at a location convenient to the operator. The holder 10 includes a body 12 which is shown as a plastic molding. The body 12 has a central container receiving aperture 14. A beverage support 15 is provided at the base of the aperture 14. A beverage container shown in phantom at 16 in Figures 2 and 3 is positioned atop the support 15 when the holder is in use.

As shown, the holder 12 includes an annular wall 18 which delineates the perimeter of the aperture 14. The wall includes a lower recessed portion 20 extending upwardly from the support 15 to a smaller diameter lip portion 22.

An annular inflatable bladder 24 is positioned in the recessed portion 20. The bladder 24 is shown in a deflated condition in Figure 2 for readily receiving a container. The bladder 24 is shown in an inflated condition in Figure 3 perimetally gripping the container 16.

An air line 25 is connected to a source of air under pressure, not shown. In the embodiment of Figures 1-3 the air line is also connected to a manually actuated control valve 26. The valve 26 includes a control button 28 which is manually operable and which functions to open and close valve 26. Thus, the valve 26 when open allows air under pressure from the supply

line 25 to flow through a line 30 to inflate the bladder as shown in Figure 3. When in a closed position the valve vents the bladder through the line 30 to atmosphere to allow the bladder to deflate to the condition shown in Figure 2.

Referring to the embodiment of Figure 4, the support 15' is a flexible membrane as contrasted with a rigid support of 15 in Figure 1. A pressure sensitive switch is provided at 32, the pressure sensitive switch is actuated by movement of the flexible membrane 15' in response to the weight a beverage container positioned in the holder. A signal from the pressure sensitive switch 32 causes a valve 26' to open and inflate the bladder 24 when the presence of beverage container has been sensed.

A photovoltaic cell 35 is mounted in a lip portion 22'. The photovoltaic cell sense the presence of a container being placed in the cupholder to cause the valve 26' to open and bladder inflation results. The provision of the photovoltaic cell 35 maybe in addition to, or as an alternate to, the pressure sensitive switch 32. In either event when the beverage container 16 is removed from the holder 12' of Figure 4 the valve 26' will open and vent the bladder to atmosphere producing the condition shown in Figure 4.

Although the invention has been described in its preferred form with a certain degree of particularity, it is understood that the present disclosure of the preferred form has been made only by way of example and that numerous changes in the details of construction, operation and the combination and arrangement of parts may be resorted to without departing from the spirit and the scope of the invention as hereinafter claimed.